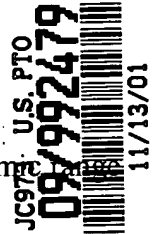


#6

In the United States Patent and Trademark Office

Application No.: Not assigned
Filed: Filed herewith
Title: Photocurrent estimation from multiple captures for simultaneous SNR and dynamic range improvement in CMOS image sensors
Applicant(s): Xinqiao Liu et al.
Examiner: Not assigned
Art Unit: Not assigned



Mailed Nov. 13, 2001
Santa Clara, CA

Information Disclosure Statement

Commissioner of Patents and Trademarks
Washington, District of Columbia 20231

Dear Sir or Madam:

Attached is a completed Form PTO-1449 and copies of the pertinent parts of the references cited thereon. It is requested that the document(s) on the enclosed form be made of record.

Part I (Authority)

This statement is filed pursuant to:

(X) 37 C.F.R. § 1.97(b).

This information disclosure statement is filed either (1) within three months of the filing date of the national applications; (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; or (3) before the mailing date of a first office action on the merits, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

() 37 C.F.R. § 1.97(c).

This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of either (1) a final action under 37 C.F.R. § 1.113 or (2) a notice of allowance under 37 C.F.R. § 1.311.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) (\$180), or a certification according to 37 C.F.R. § 1.97(e).

() 37 C.F.R. § 1.97(d).

This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c).

Accordingly, this information disclosure statement requires the petition fee specified in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d) (\$180), a certification according to 37 C.F.R. § 1.97(e), and a petition requesting consideration of the information disclosure statement.

Conditional Petition

It is respectfully requested that this information disclosure statement be considered, good cause being presented in Part III herein (certification). please treat this paper as the required petition.

If this statement crosses in the mail with an office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record.

To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

Part II (Payment)

A check is enclosed as indicated:

- ☒ (X) No fee is due.
- ☐ () The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) is enclosed (\$240).
- ☐ () The petition fee specified in 37 C.F.R. § 1.17(i)(1) to consider an information disclosure statement under 37 C.F.R. § 1.97(d) is enclosed (\$130).

Part III (Certification)

Pursuant to 37 C.F.R. § 1.97(e), I certify:

- ☒ (X) No certification is necessary.
- ☐ ()
 - (1) Each item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the statement.
 - ☐ () The "communication from a foreign patent office" referred to in the certification is an International Search Report, possibly issued by the U.S. Patent and Trademark Office in its capacity as an International Search Authority or International Preliminary Examining Authority.
 - ☐ () The "counterpart foreign application" referred to in the certification corresponds to an ancestor or descendent application of the application for which this information disclosure statement is filed.
- ☐ ()
 - (2) No item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, or, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c), more than three months prior to the filing of the statement.

Part IV (Additional Statement)

An additional statement regarding these items of information ☐ () is, ☒ (X) is not, enclosed.

Copies of the cited art ☒ (X) are enclosed, ☐ () are of record in parent application Serial No. _____ and will be provided if the Examiner deems it convenient.

Respectfully submitted,

Dated: *Nov. 13, 2001*



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	Q	M. R. Banham; "Digital image restoration;" IEEE SIGNAL PROCESSING MAGAZINE, VOL. 14 NO. 2, PP.24-41, MARCH 1997
	R	N. Stevanovic et al.; "A CMOS image sensor for high speed imaging;" ISSCC DIG. TECH. PAPERS, PP. 104-105, FEB 2000
	S	S. Kleinfelder et al.; "A 10,000 frames/s 0.18μM CMOS digital pixel sensor with pixel-level memory;" ISSCC DIG. TECH. PAPERS, FEB 2001
	T	O. Yadid-Pecht; "Wide intrascene dynamic range CMOS APS using dual sampling;" IEEE TRANS. ON ELECTRON DEVICES, VOL. 44 NO. 10, PP. 1721-1723, OCT. 1997
	U	D. Yang; et al.; "A 640 X 512 CMOS image sensor with ultra-wide dynamic range floating-point pixel level ADC;" IEEE J. SOLID-STATE CIRCUITS, VOL. 34, NO. 12, PP.1821-1834, DEC. 1999
	V	D. Yang et al.; "Comparative analysis of SNR for image sensors with enhanced dynamic range;" PROCEEDINGS OF THE SPIE, VOL. 3649, SAN JOSE, CA, JAN. 1999
	W	A. El. Gamal et al.; "Pixel level processing why?, what?, and how?" PROCEEDINGS OF THE SPIE, VOL. 3650, PP. 2-13, JAN. 1999
	X	S. H. Lim et al.; "Integration of image capture and processing-beyond single chip digital camera;" PROCEEDINGS OF THE SPIE, VOL. 4306, MARCH, 2001
	Y	X. Liu et al.; "Photocurrent estimation from mutiple non-destructive samples in a CMOS image sensor;" PROC. OF SPIE, VOL. 4306, MARCH, 2001
	Z	S. J. Decker; " A 256X256 CMOS imaging array with wide dynamic range pixels and column-parallel digital output;" IEEE JOURNAL OF SOLID STATE ICRCUITS, VOL. 33, PP. 2081-1091, DEC, 1998
EXAMINER		DATE CONSIDERED
<p>* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</p>		

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE	ATTY. DOCKET NO. S01-019/US	SERIAL NO. Not assigned
LIST OF PRIOR ART CITED BY APPLICANT (Use several sheets if necessary)	APPLICANT Xinqiao Liu et al	
	FILING DATE Filed herewith	GROUP Not assigned

U.S. PATENT DOCUMENTS

EXAMINER • INITIAL		DOCUMENT NUMBER							DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	A	5	2	7	2	5	3	5	12/21/93	Elabd	358	213.11	6/13/91
	B	5	4	6	1	4	2	5	10/24/95	Fowler et al.	348	294	2/15/94
	C	5	5	8	3	3	6	7	12/10/96	Blossfeld	257	426	1/17/95
	D	5	7	4	2	0	4	7	4/21/98	Buhler et al.	250	214	10/1/96
	E	5	8	0	1	6	5	7	9/1/98	Fowler et al.	341	155	2/5/97
	F	5	8	4	1	1	2	6	11/24/98	Fossum et al.	250	208.1	1/24/975
	G	5	9	0	0	6	2	3	5/4/99	Tsang et al	250	208	8/11/97
	H	5	9	6	9	7	5	8	10/19/99	Sauer et al.	348	241	6/2/97
	AA	6	0	7	8	0	3	7	6/20/00	Booth, Jr.	250	208.1	4/16/98
	BB	6	1	3	0	4	2	3	10/10/00	Brehmer et al.	250	208.1	7/10/98
	CC	6	1	5	7	0	1	6	12/5/00	Clark et al.	250	208.1	9/30/97

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[illegible]

OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)

	L	Non-Sum Wong; "Technology and device scaling considerations for CMOS imagers;" IEEE TRANSACTIONS ON ELECTRON DEVICE, VOL. 43, NO. 12, DECEMBER 1996
	M	D. Yang et al.; "Comparative analysis of SNR for image sensors with enhanced dynamic range;" SPIE, EL 1999
	N	E. R. Fossum; "CMOS image sensors: electronic camera-on-chip;" IEEE TRANSACTIONS ON ELECTRON DEVICE, VOL. 44, NO. 10, OCT. 1996
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	P	D. Kundur et al.; "Blind image deconvolution;" IEEE SIGNAL PROCESSING MAGAZINE, VOL. 13 NO. 5, PP.43-64, MAY 1996